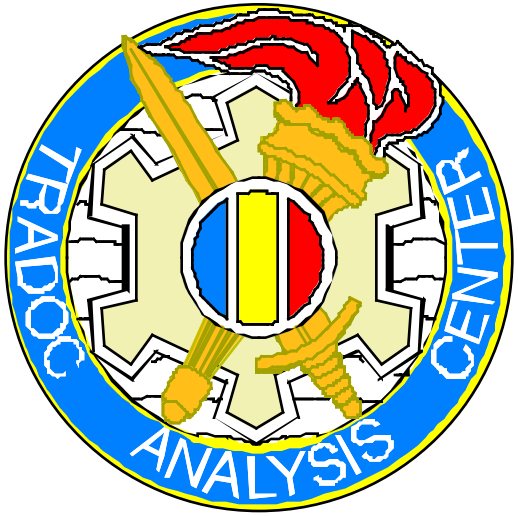
The Value of Air Defense Protection to the Force-on-Force Battle

A Distributed Approach



Richard L. Calkins
TRAC, Ft Leavenworth, KS
(913) 684-9255/4595, DSN 552
Email: calikinsr@trac.army.mil

MORS Mini-Symposium
"Complexity in M&S-Linkage"

25-26 February 1997

The Federation of VIC & EADSIM

Integration of High-Res Air Defense activity into a Mid-Res force-on-force environment to measure the protection to the maneuver force by a new or improved Air Defense system.

Problem ...

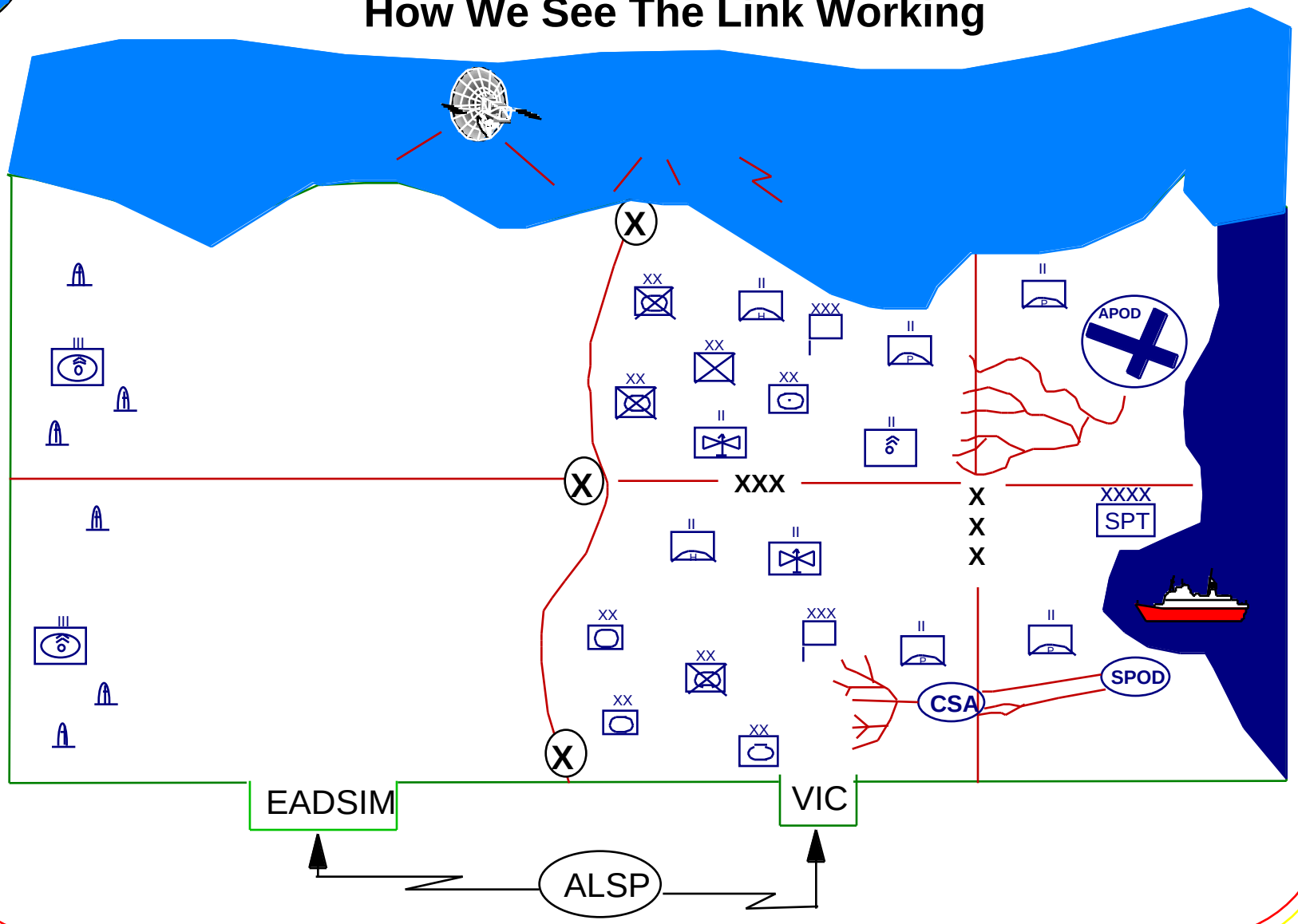
- Solve TRADOC's inability to reflect the contribution of AD, in a TMD context, to the force-on-force battle.
  - Past analysis was a comparison of 'Leakers.'
  - Subjectively draw conclusions as to the value of the new system based on the relative assumption that fewer leakers caused less damage to the force.

Linkage Considerations ...

- Conduct feasibility study of potential federates
  - Compare architectures, data structures, resolution
  - Look for dissimilarities like:
    - discrete events vs large time steps
    - platform vs large entity representation
    - deterministic vs stochastic
  - ALSP selected

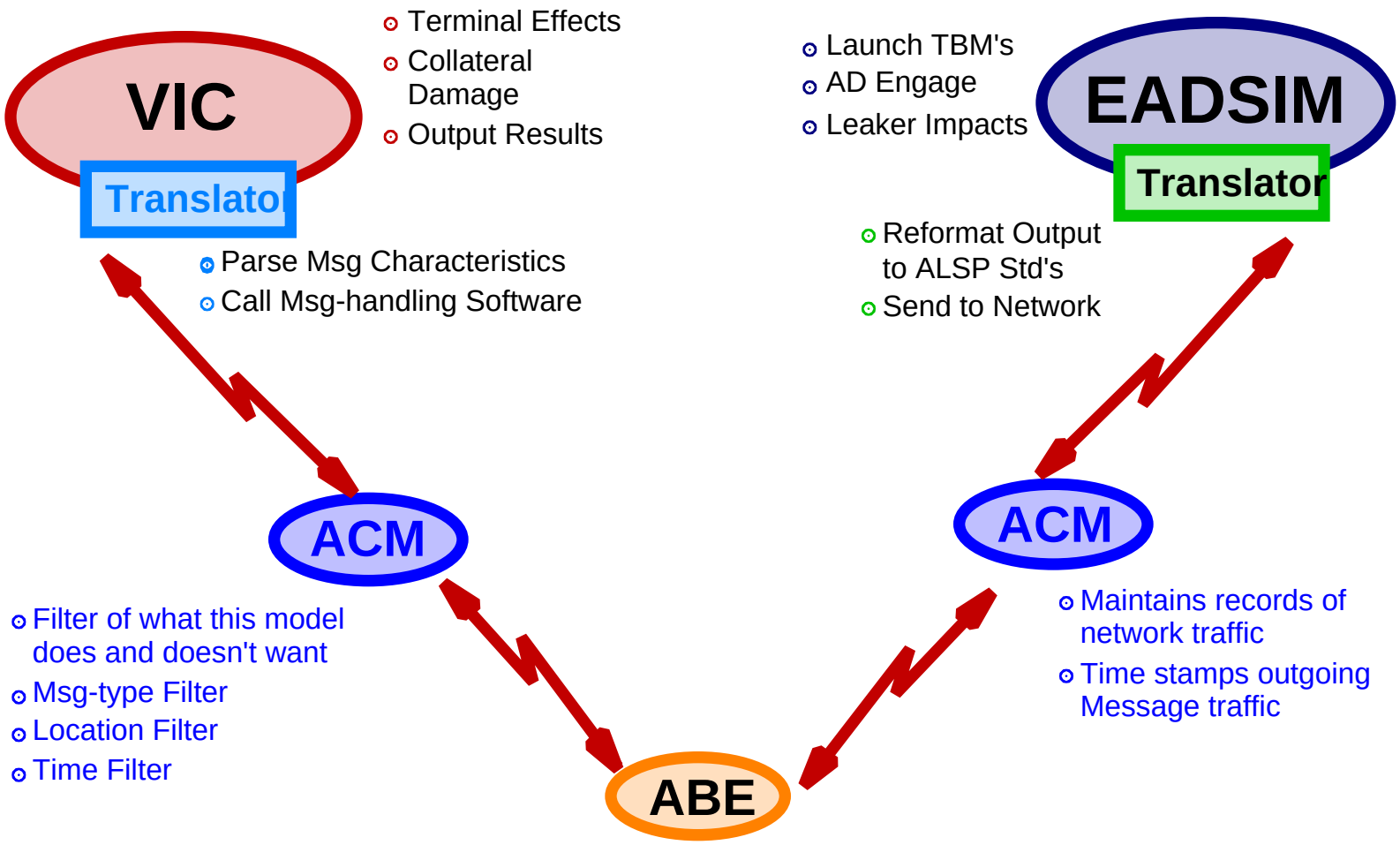
Operational Concept ...

How We See The Link Working

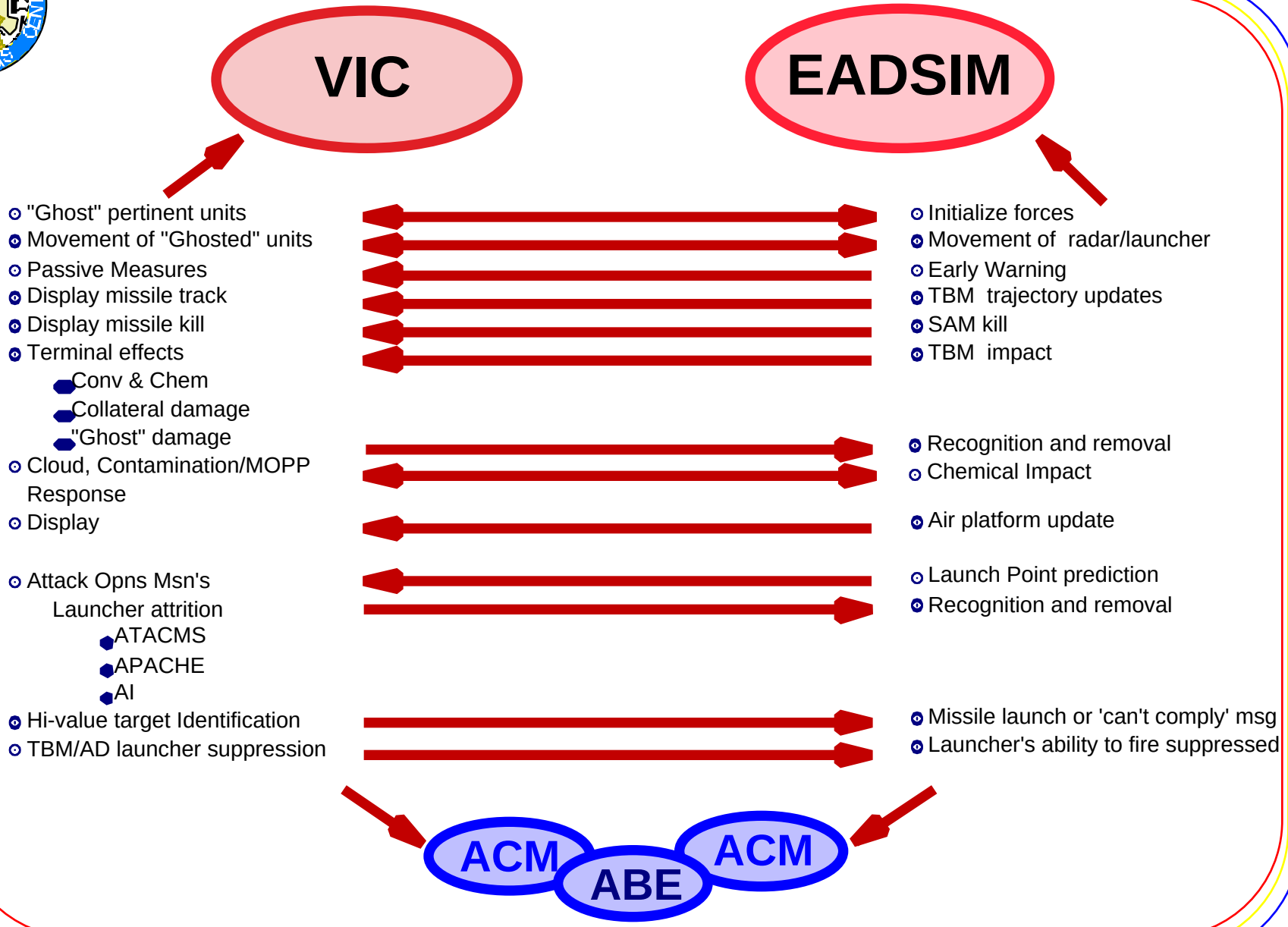


Aggregate Level Simulation Protocol (ALSP) ...

ALSP Architecture



Functional Information Exchange ...



Applications ...

- TMD AWE: Passive Defense Issues
  - High value target analysis
  - Radar accuracy vs warning area
  - Warning message latency
- JPSD: Defense of the Korean Peninsula Issues
  - Patriot defense of allied air bases
  - Terrain masking for aerial sensors
  - Threat air avenues of approach over indefensible terrain
- Corps Sam COEA:
  - EADSIM - physical AD performance issues
  - VIC - operational and deployment issues

Conclusions ...

- Analytic success for both dynamic and static linked environments.
- Integrates the strengths of two independent models, saving software development and personnel expenses.
- The concept works, and from a Computer Science perspective the fundamentals of linking models is not particularly difficult or necessarily expensive - but ...
- Someone who is inclined to 'federate' to solve an analytical problem should be aware of:
  - Unlikely the linkage is of mutual benefit and you probably only control the destiny of <u>your</u> model, so
    - costs and resources to develop 'other' model(s) may be high, and
    - schedules/work programs may not fit your timeline requirements, and
    - **HLA compliance won't eliminate these issues.**
  - Piecing together an analytic environment should include:
    - Repeatability
    - Network reliability (local vs long distance)
    - Communication reliability (point-to-point vs broadcast)


THAD
ANALYSIS
CENTER

Not a New Start

Vision

One simulation -- the simulation of choice -- for Army issues in the Joint Task Force context.

AWARS/JTF

Rationale

- Army needs single Corps/JTF simulation supporting the next decade of analysis.
- And for integration with C4I equipment, simulators, and other high resolution models and capable of running in stand-alone mode.
  - Supports standard sensitivity analysis
  - Creates a model - exercise - model environment for studying those systems with new TTPs (C4I systems)
  - Support DA in analysis for programs being reviewed by OSD-PA&E (compatible with JWARS)
  - CLCGF engine
- Dwindling resources demand focus on single model

AWARS/JTF

Objectives

- Provide one central simulation which will support users of VIC and Eagle
- Model will be:
  - object oriented
  - HLA compliant
  - variable run speed
  - systemic capable (batch mode)
  - interface with simulators & C4I equip
  - unit representation; company -- corps
  - VIC functionality in C4I, Arty, CSS
  - Eagle Terrain & C2 functionality
- Provides structure integratable with JWARS which will serve as the Army's Joint Task Force model